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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/Gradation/2014-15

05.08.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements and Asphalting to BEL Layout and NTI Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VP/34/2014-15 Dated: 03.08.2014

Date of Testing : 05.08.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25100**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	850	850	3.4	96.6	95-100
22.4	5515	6365	25.4	74.6	60-80
11.2	5775	12140	48.4	51.6	40-60
4.75	4005	16145	64.3	35.7	25-40
2.36	3950	20095	80.1	19.9	15-30
0.600	2240	22335	89.0	11.0	8-22
0.075	2480	24815	98.9	1.1	0-8

Note:

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ವಿದ್ಯಾರಣ್ಯಪುರ ಉಪ ವಿಭಾಗ
ಯಲಹಂಕ ವಲಯ,
ಬೃ. ಬೆಂ. ಮ. ಪಾ., ಬೆಂಗಳೂರು-97.

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Bitumen/2014-15 22.08.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP,
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements and Asphalting to BEL Layout and NTI Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	AEE/VP/34/2014-15 Dated: 03.08.2014
SAMPLE I/D	Asphalting to BEL Layout and NTI Layout road in Ward No.09.
DATE OF TESTING	22.08.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	475
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	25.00
7. Bitumen content in %	5.00	5.00
8. Average	**5.00**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	39.63	8.34	8.34	91.66	90-100
4.75	260.2	54.78	63.12	36.88	35-51
2.36	53.21	11.20	74.32	25.68	24-39
1.18	43.25	9.11	83.43	16.57	15-30
0.3	29.36	6.18	89.61	10.39	9-19
0.075	27.14	5.71	95.32	4.68	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	29.32	5.86	5.86	94.14	90-100
4.75	242.6	48.52	54.38	45.62	35-51
2.36	90.23	18.05	72.43	27.57	24-39
1.18	51.26	10.25	82.68	17.32	15-30
0.3	32.63	6.53	89.21	10.79	9-19
0.075	25.32	5.06	94.27	5.73	3-8

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/Gradation/2014-15

05.08.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements and Asphalting to BEL Layout and NTI Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VP/34/2014-15 Dated: 03.08.2014

Date of Testing : 05.08.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25235**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	980	980	3.9	96.1	95-100
22.4	5685	6665	26.4	73.6	60-80
11.2	5265	11930	47.3	52.7	40-60
4.75	4150	16080	63.7	36.3	25-40
2.36	4005	20085	79.6	20.4	15-30
0.600	2350	22435	88.9	11.1	8-22
0.075	2515	24950	98.9	1.1	0-8

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/AIV/2014-15

05.08.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to BEL Layout and NTI Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VP/34/2014-15 Dated: 03.08.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	05.08.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299	
4	Aggregate Impact value = percent fines	21.11	21.32	
	100* (W_2/W_1)%			**21.27**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/S-T/2014-15 05.08.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of Work	Improvements and Asphalting to BEL Layout and NTI Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VP/34/2014-15 Dated: 03.08.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	05.08.2014

Result : Flakiness Index = **12.58%**

Elongation Index = **13.10%**

Result : Combined Flakiness & Elongation index **25.68%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/AIV/2014-15

22.08.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to BEL Layout and NTI Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VP/34/2014-15 Dated: 03.08.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	22.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	379	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	84.5	298	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.16	21.37	**21.27**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Shape_T/2014-15 : 22.08.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements and Asphalting to BEL Layout and NTI Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: AEE/VP/34/2014-15 Dated: 03.08.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 22.08.2014

Result : Flakiness Index = **12.55%**

Elongation Index = **13.45%**

Result : Combined Flakiness & Elongation index **26.00%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Sp_Wa/2014-15 22.08.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to BEL Layout and NTI Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VP/34/2014-15 Dated: 03.08.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	22.08.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2025	2026	2024	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1270	1271	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2016	2017	2018	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	746	746	749	
6	Weight of oven dried aggregate	W_4 g	2003	2002	2001	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.685	2.684	2.672	2.680
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.733	2.739	2.734	2.735
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.65%	0.75%	0.85%	0.75%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Stripping/2014-15 22.08.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements and Asphalting to BEL Layout and NTI Layout Balance roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VP/34/2014-15 Dated: 03.08.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	22.08.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.20	96.80
2	3.1		
3	3.3		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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